# Rhode Island State Energy Plan

## Advisory Council Meeting #5

May 9, 2013

# Advisory Structure

## Advisory Council

- Meets on a monthly basis
- Evaluates and provides feedback on research to assist staff in preparing a Preliminary Draft Plan
- Recommends Preliminary Draft Plan to the State Planning Council's Technical Committee for forwarding to the State Planning Council for public hearing, revision, and adoption

# Timeline

## Project Phases

| |
|---|
| **Phase I: Research & Data Collection (December 2012 – May 2013)**<br>Gather and synthesize the best available energy data; Set measurable goals based on modeling analysis and stakeholder feedback; Design an actionable implementation strategy |
| **Phase II: Preparation of Preliminary Draft Plan (June 2013 – September 2013)**<br>Distill research developed during Phase I into a Preliminary Draft Plan |
| **Phase III: Technical & Public Review (October 2013 – March 2014)**<br>Vet Preliminary Draft Plan through a technical and public review process; Adopt Plan as State Guide Plan Element |

# Today

## May Meeting

**Agenda:**

- Continuation of Task 3: Scenarios

DRAFT

NAVIGANT ENERGY

AQUINERGY
Experts in Renewable Energy and Sustainable Development

# RHODE ISLAND STATE ENERGY PLAN TECHNICAL ASSISTANCE

*Advisory Council Meeting*

RIEDC Rhode Island Economic Development Corporation
Rhode Island, Working Again.

REF Renewable Energy Fund
A Program of the Rhode Island Economic Development Corporation


May 9, 2013



.

DRAFT

# Today's agenda includes the following:

1. Introduction and Purpose
2. Workflow: Targets, Strategies, and Scenarios
3. Electric, Thermal, and Transportation Targets
4. Straw-man Scenarios
5. Next Steps





NAVIGANT ENERGY

DRAFT

1. **Introduction and Purpose**
2. **Workflow: Targets, Strategies, and Scenarios**
3. **Electric, Thermal, and Transportation Targets**
4. **Straw-man Scenarios**
5. **Next Steps**





NAVIGANT ENERGY

**The purpose of today's meeting is two fold:**

## 1. Introduce Targets

- Introduce the target setting exercise and explain how this fits with strategy development and scenario modeling process

## 2. Solicit Feedback

- Solicit feedback from the Advisory Council on the appropriateness of the proposed targets and new straw man scenarios

DRAFT

1. Introduction and Purpose
2. Workflow: Targets, Strategies, and Scenarios
3. Electric, Thermal, and Transportation Targets
4. Straw-man Scenarios
5. Next Steps

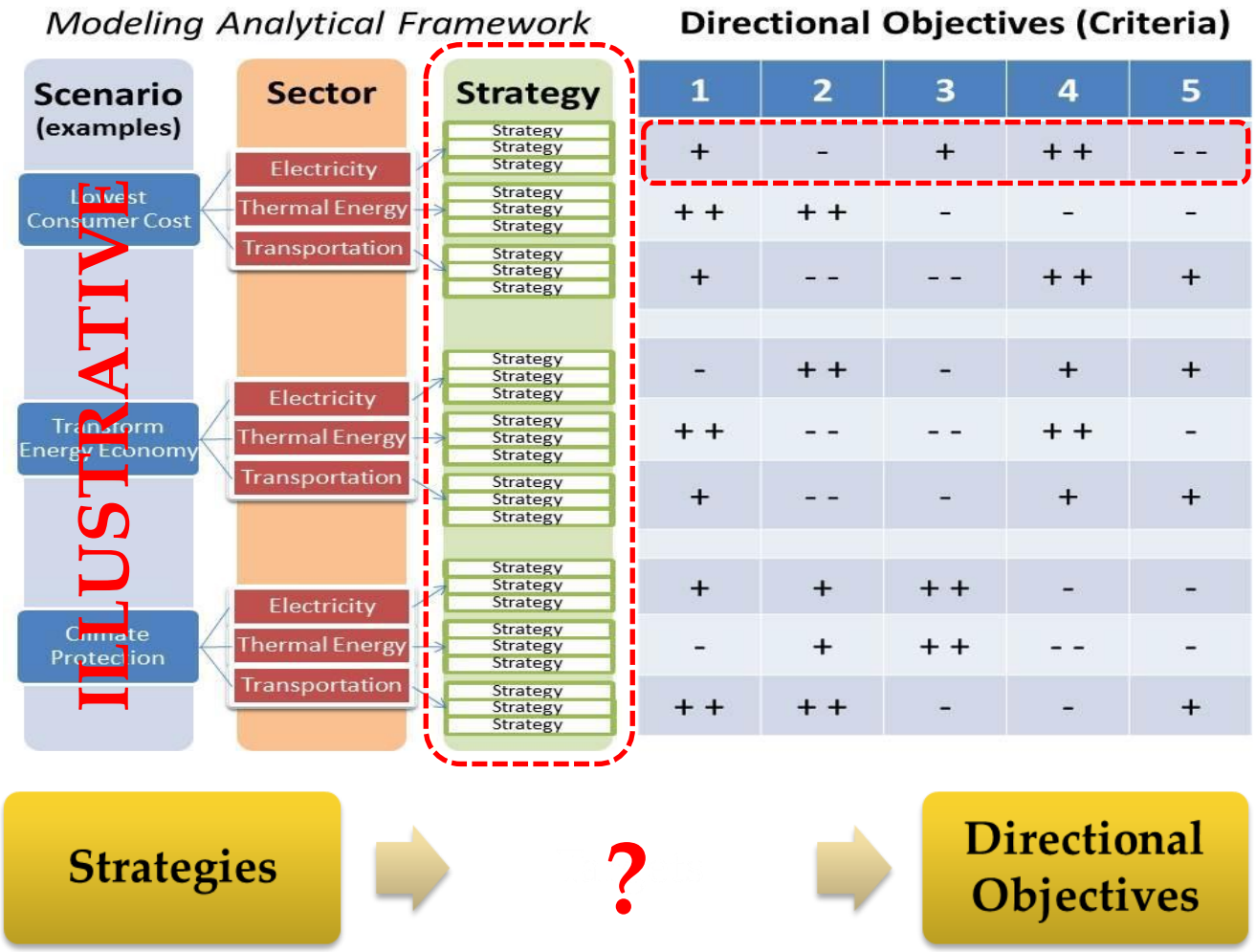




NAVIGANT ENERGY

DRAFT

# Feedback from piloting the survey tool led to an improved methodology for strategy development.








NAVIGANT ENERGY

DRAFT

# We will develop strategies aimed at meeting key targets for change in energy supply and demand.

## Define Scenarios

- 3 Alternative Energy Futures
- Each Scenario includes different weights for each Directional Objective (Security, Cost Effectiveness, Economic Development, Sustainability)

## Set Targets

- Changes in the Future Supply Infrastructure and Demand Profile
- Low, Moderate, and Aggressive Targets
- EG: 17, 35, or 150 MW of Residential Solar by 2023

## Develop Strategies

- Develop a suite of policies and programs directed at meeting each target
- EG: On-bill financing, renewed FIT, Statewide SREC fixed value

## Model Effects

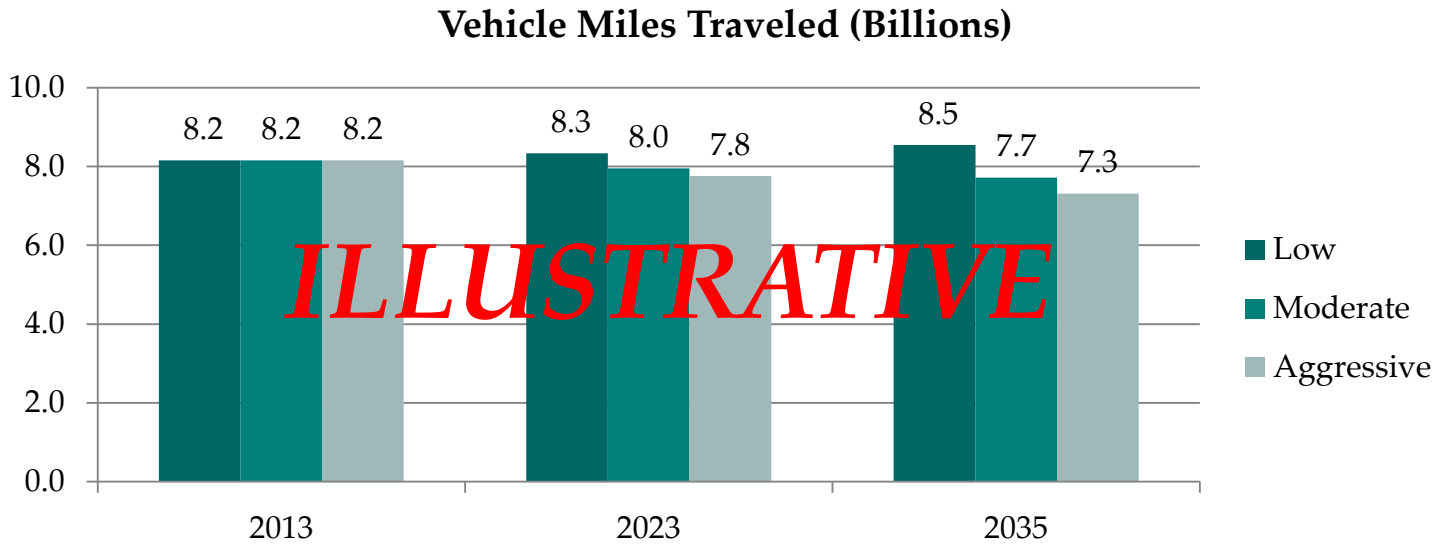
- For each scenario, select the group of strategies and targets that best fulfill the prioritized directional objectives
- Model the aggregate effects of the chosen strategies on the directional objectives





NAVIGANT ENERGY

# Low, moderate, and aggressive targets were set for each aspect of the energy supply infrastructure or demand profile.




- The low bounds correspond to future changes if existing policies prevail and market characteristics continue.
- The moderate targets correspond to achievable change with moderate policies and programs in place.
- The aggressive targets reflect the upper bound of possible change with substantial aggressive policies and programs.





NAVIGANT ENERGY

DRAFT

1. Introduction and Purpose
2. Workflow: Targets, Strategies, and Scenarios
3. Electric, Thermal, and Transportation Targets
4. Straw-man Scenarios
5. Next Steps





NAVIGANT ENERGY

DRAFT

# Navigant has developed low, moderate, and aggressive targets for change across the following 10 categories for the electric sector.

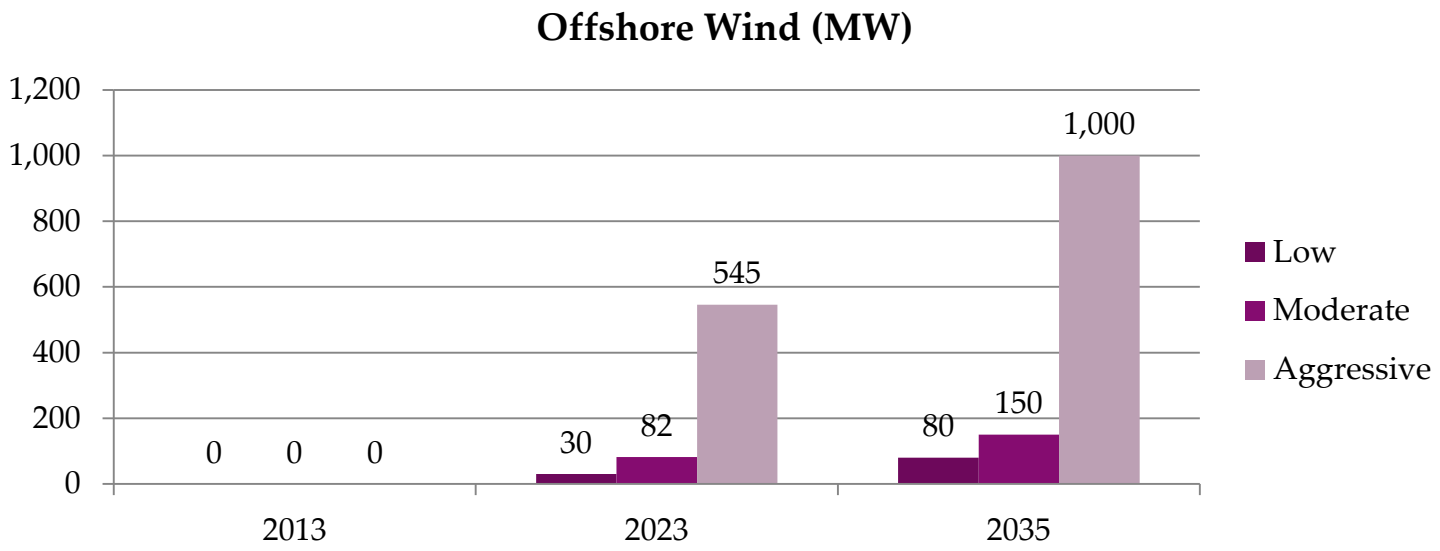





NAVIGANT ENERGY

DRAFT

# Develop Offshore Wind Resources



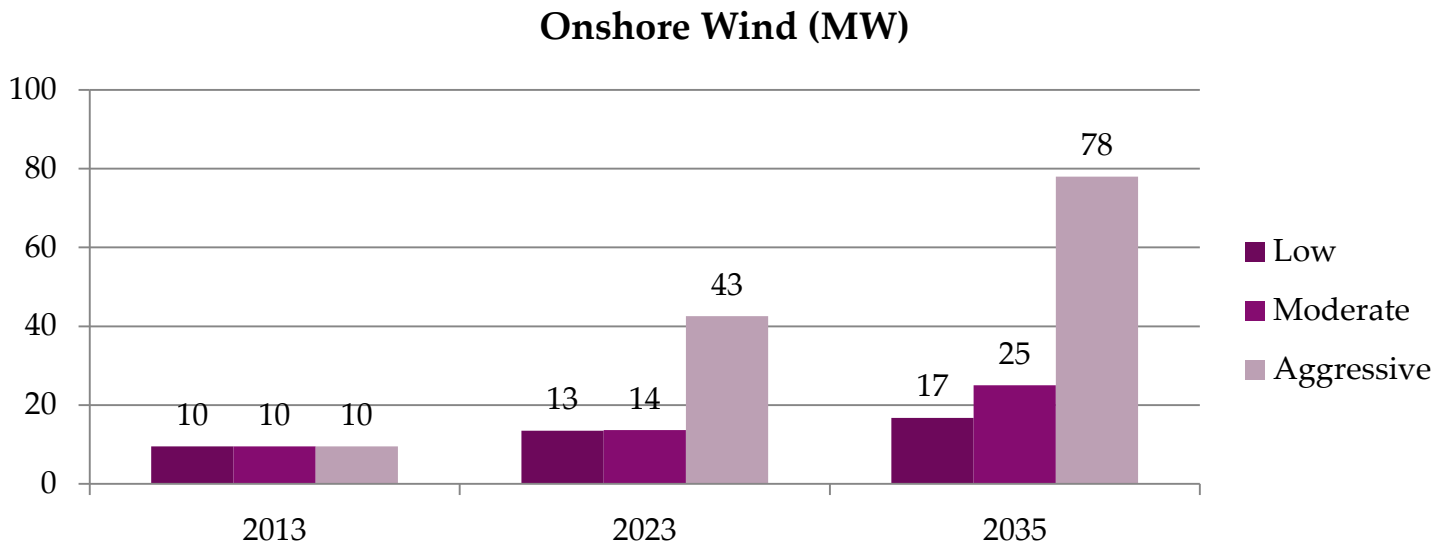

- The low target is based on planned capacity from Block Island Wind Farm and comparable rates of capacity expansion through 2035.
- The moderate targets are based on the realization projects evaluated as part of PUC long-term contracting statutes.
- The aggressive goals are based on the equivalent of successful execution of a proposal for 1,000 MW of offshore wind by 2035 and back cast to set interim targets.





NAVIGANT ENERGY

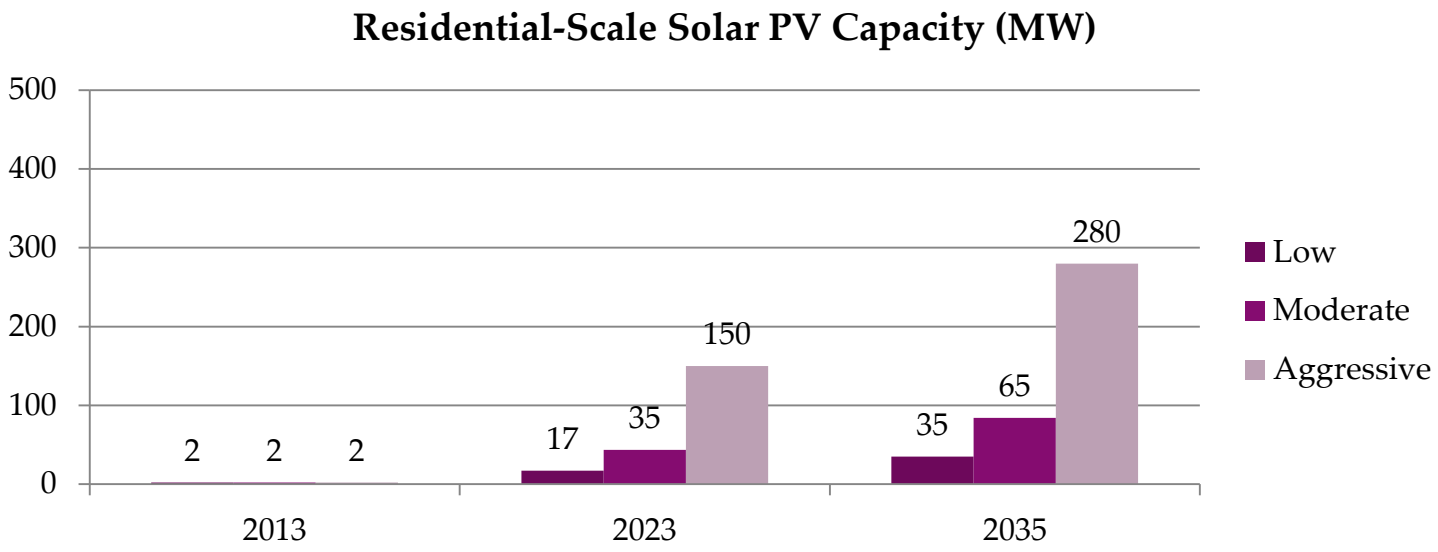
# Develop Onshore Wind Resources




- The low target is based on historical growth rates and adjusted to achieve a maximum of 3% of load.
- The moderate target is based on achieving one 1.5MW and five 100kW installations in 10 towns by 2035.
- The aggressive target are based on achieving one 1.5MW and five 100kW installations per town (39 towns total) in Rhode Island.

DRAFT

# Develop Residential Solar PV Resources




- The residential solar PV capacities are based on data from National Grid and the US Census Bureau.
- The moderate goal targets 65 MW of residential solar PV capacity by 2035.
- The aggressive goal targets 280 MW of residential solar PV capacity by 2035, estimated to be the maximum residential solar PV capacity, and back casts annual changes to arrive at the projected 2023 level.

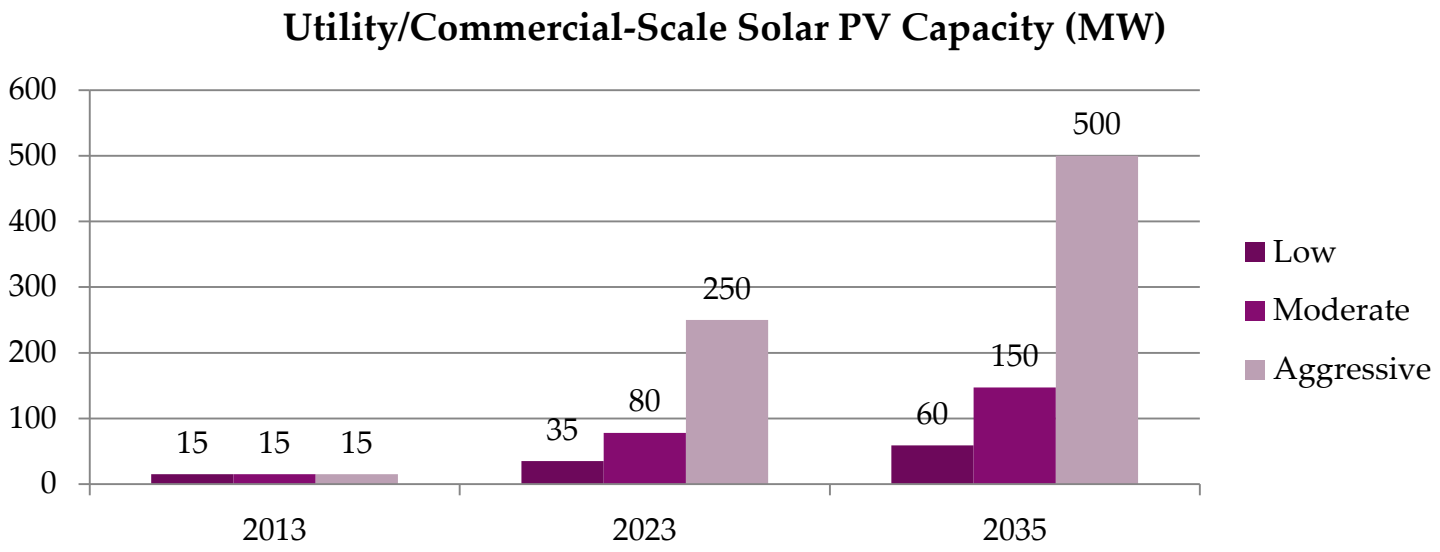




NAVIGANT ENERGY

DRAFT

# Develop Utility/Commercial Solar PV Resources



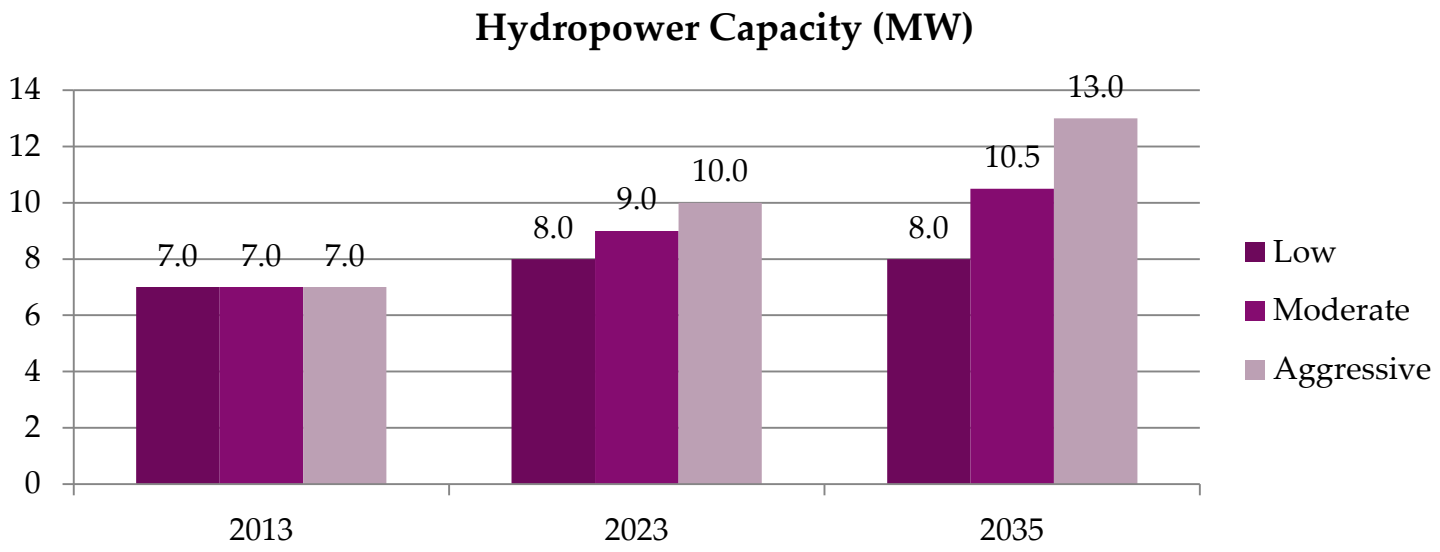

- The utility and commercial scale solar PV capacities are estimated from National Grid data and Renewable Energy Siting Partnership.
- The moderate goal targets 150 MW of utility/commercial scale solar PV capacity by 2035.
- The aggressive goal targets 500 MW of utility/commercial scale solar PV capacity by 2035, which represents the approximate maximum commercial solar capacity in Rhode Island.





NAVIGANT ENERGY

# Develop Hydropower Resources



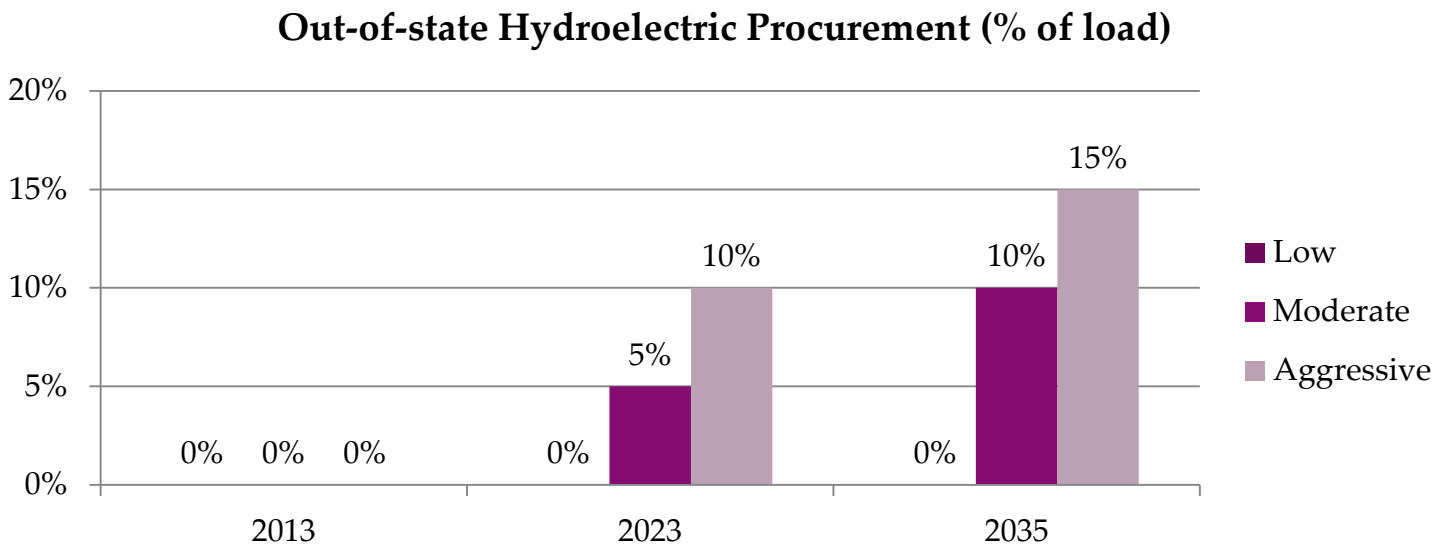

- The hydropower capacity estimates are based on FERC data on hydro projects in the US and a 2011 RI Renewable Energy Fund study evaluating the potential Tier 1 hydropower in Rhode Island.
- The moderate goal targets achieving 10.5 MW of hydropower capacity by 2035, an average of the low and aggressive targets.
- The aggressive goal targets 13 MW of hydropower capacity by 2035, which represents the maximum Tier 1 hydropower capacity.





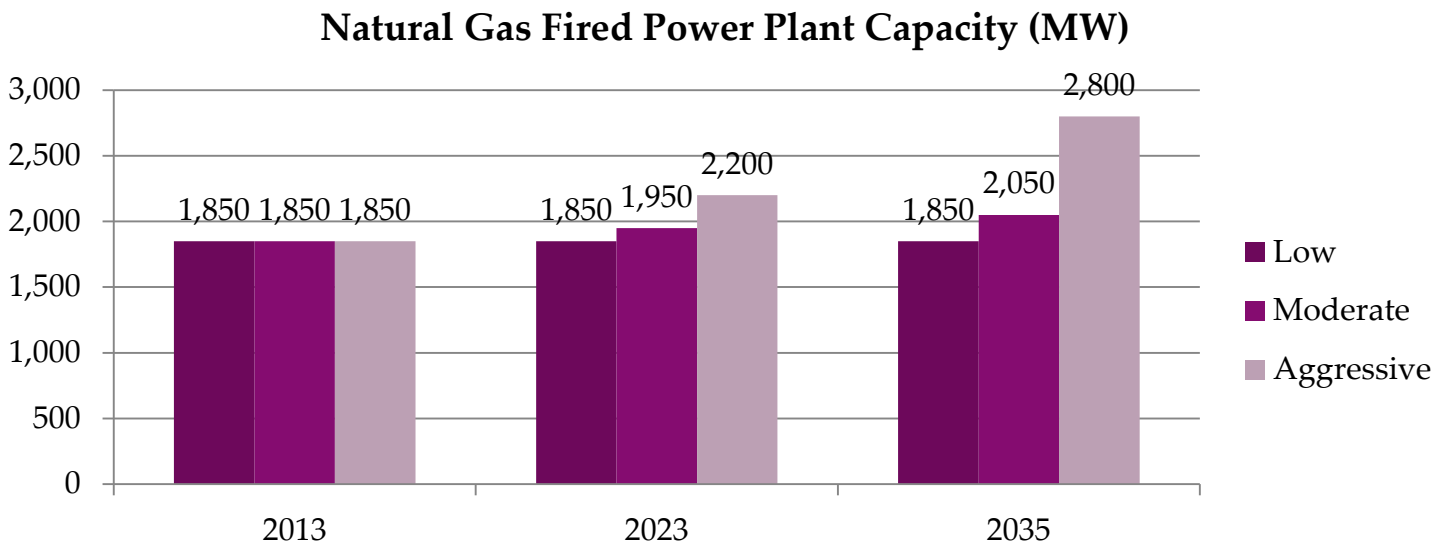
NAVIGANT ENERGY

# Procure Electricity from Out-of-State Hydroelectric Resources



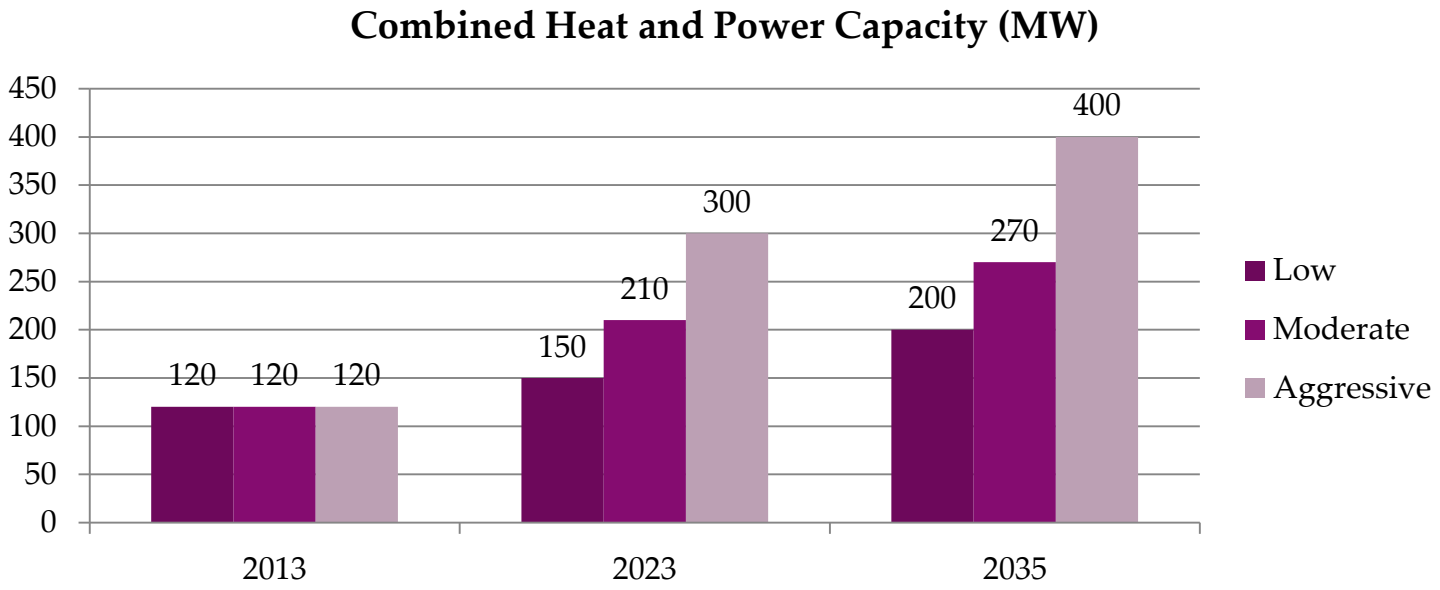

- The low bound for out-of-state procurement of hydroelectric power is set at zero.
- The moderate targets 5% of load be met through procurement of large-scale out-of-state hydroelectric generation by 2023, and 10% by 2035.
- The aggressive targets 10% of load be met through procurement of large-scale out-of-state hydroelectric generation by 2023, and 15% by 2035.

# Expand Natural Gas Fired Power Plant Capacity



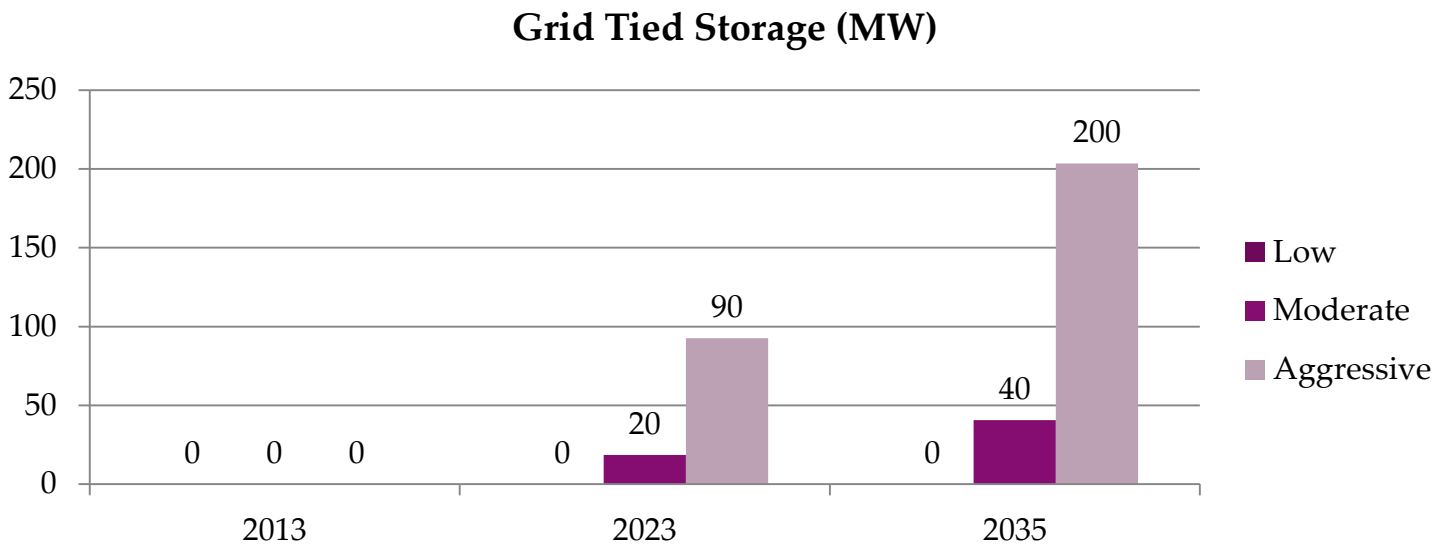

- The NG fired power plant capacity estimates are derived from ISO New England's Rhode Island 2012-2013 State Profile and EIA's projection on increased energy production from NG.
- The moderate goal targets 2,050 MW by 2035.
- The aggressive goal targets an in-state NG fired power plant capacity of 2,200 MW by 2023 and 2,800 MW by 2035, an increase in capacity of NG generation of 21% by 2023 and 50% by 2035.

# Expand Combined Heat and Power Capacity




- The CHP capacity estimates are based on 2012 CHP Study for DOE EERE, a 2000 DOE CHP Potential Study and EERMC's Opportunity Report, Phase 1*.
- The moderate goal targets an in-state CHP capacity of 270 MW by 2035, which is reached through an annual additions of 7 MW.
- The aggressive goal targets an in-state CHP capacity of 400MW by 2035, which is reached through an annual penetration rate 2 times that of the low target.

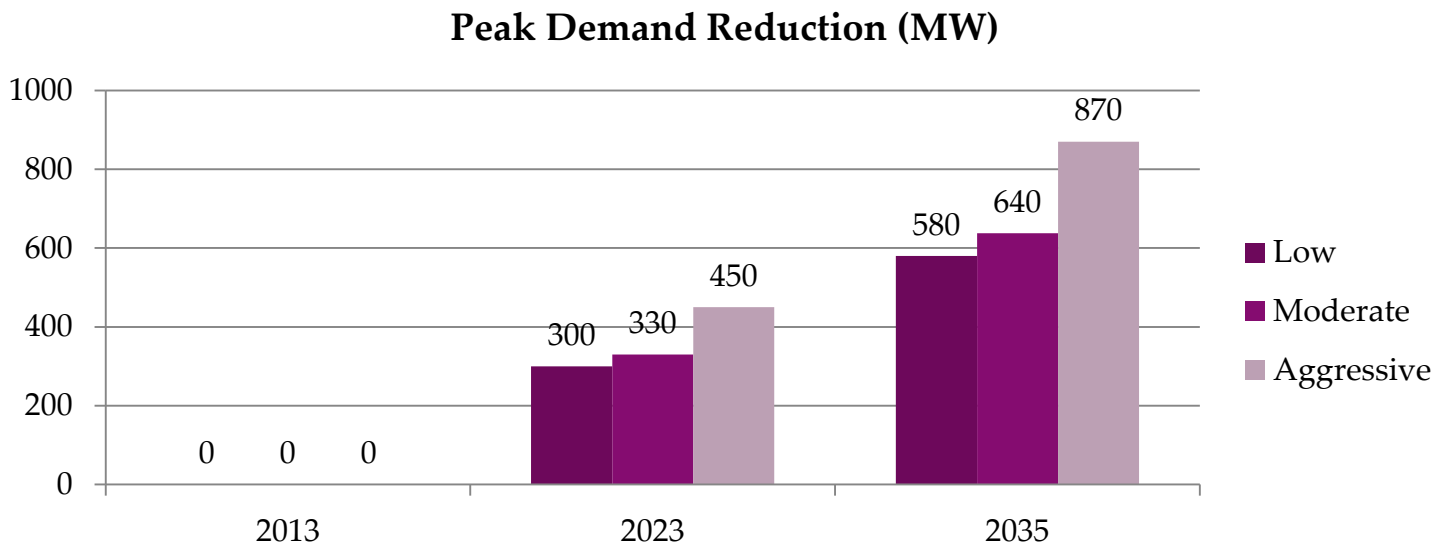
# Develop Grid Tied Electric Storage




- The electric energy storage estimates were derived from the Market Evaluation for Energy Storage in the US study by Kema.
- The moderate goal targets 40 MW of grid tied storage by 2035.
- The aggressive goal targets 200MW of grid tried storage by 2035, which corresponds to 11% of 2013 generating capacity in Rhode Island.

DRAFT

# Increase Peak Demand Reduction



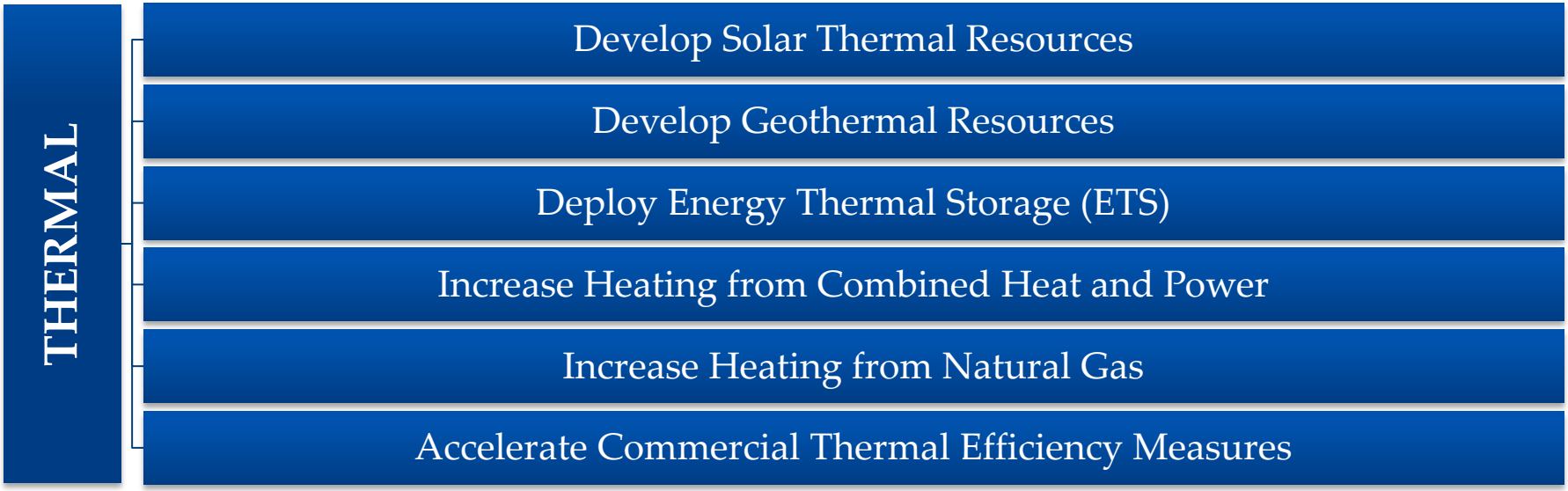

- The peak demand reduction estimates are based on ISO-NE's Final Energy Efficiency Forecast for 2016-2022 and a 2008 Rhode Island Efficiency Potential by KEMA.
- The moderate goal targets a 640 MW peak demand reduction, 60 MW greater than the low bound.
- The aggressive goal targets a peak demand reduction of 870 MW by 2035 , which is 1.5 times the peak demand reduction of the low target.



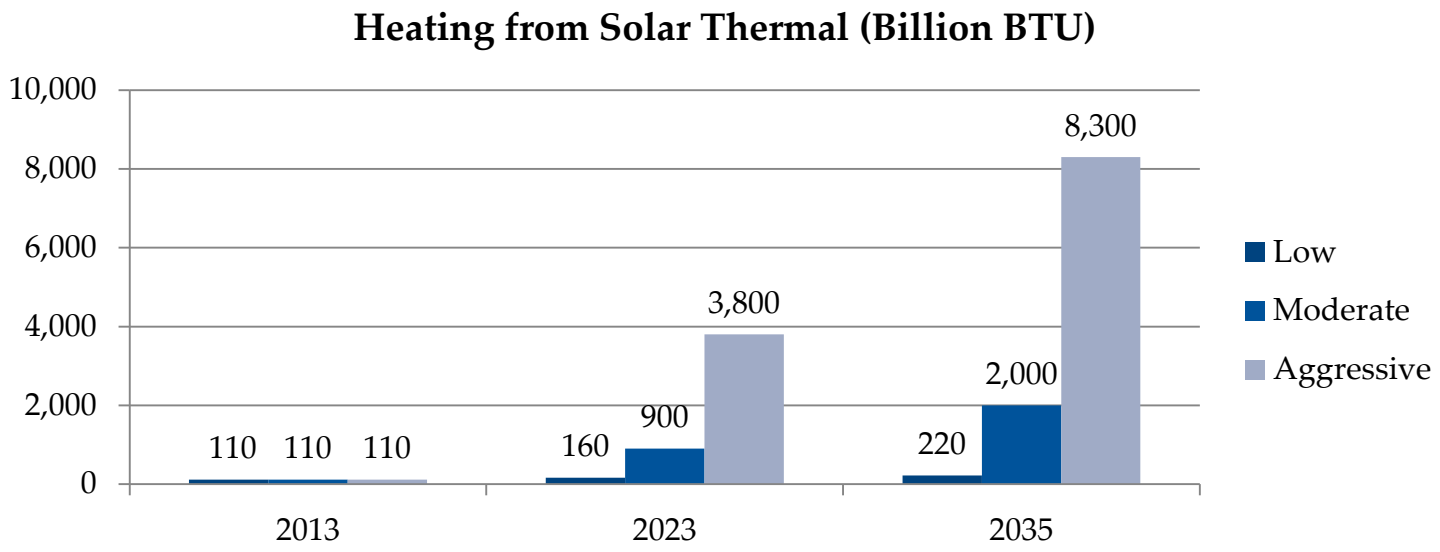


NAVIGANT ENERGY

# Navigant has developed low, moderate, and aggressive targets for change across the following 6 categories for the thermal sector.



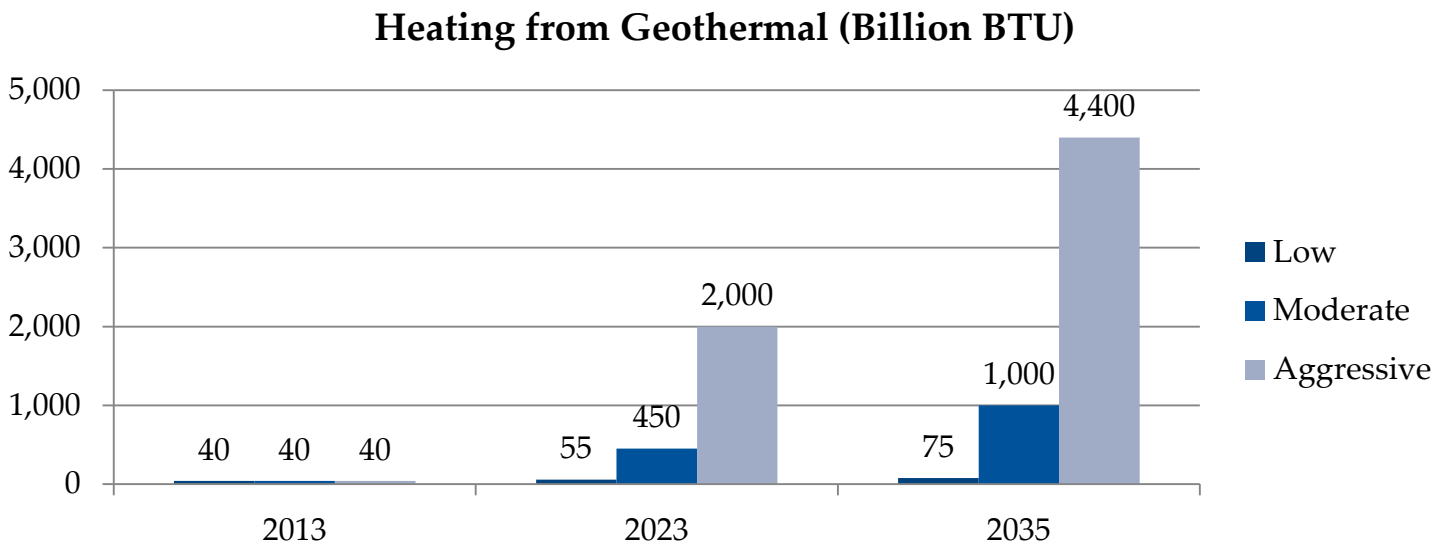
# Develop Solar Thermal Resources




- The heating from solar thermal estimates were derived from ENE's forecasts, American Community Survey results and a study by the Solar Energy Laboratory at the University of Minnesota.
- The moderate goal targets 2.0 T BTU by 2035, which corresponds to roughly 18% of homes using solar thermal heating by 2035.
- The aggressive goal targets 8.3 T BTU of solar thermal by 2035, which corresponds to 75% of homes using solar thermal heating by 2035.

DRAFT

# Develop Geothermal Heating Resources



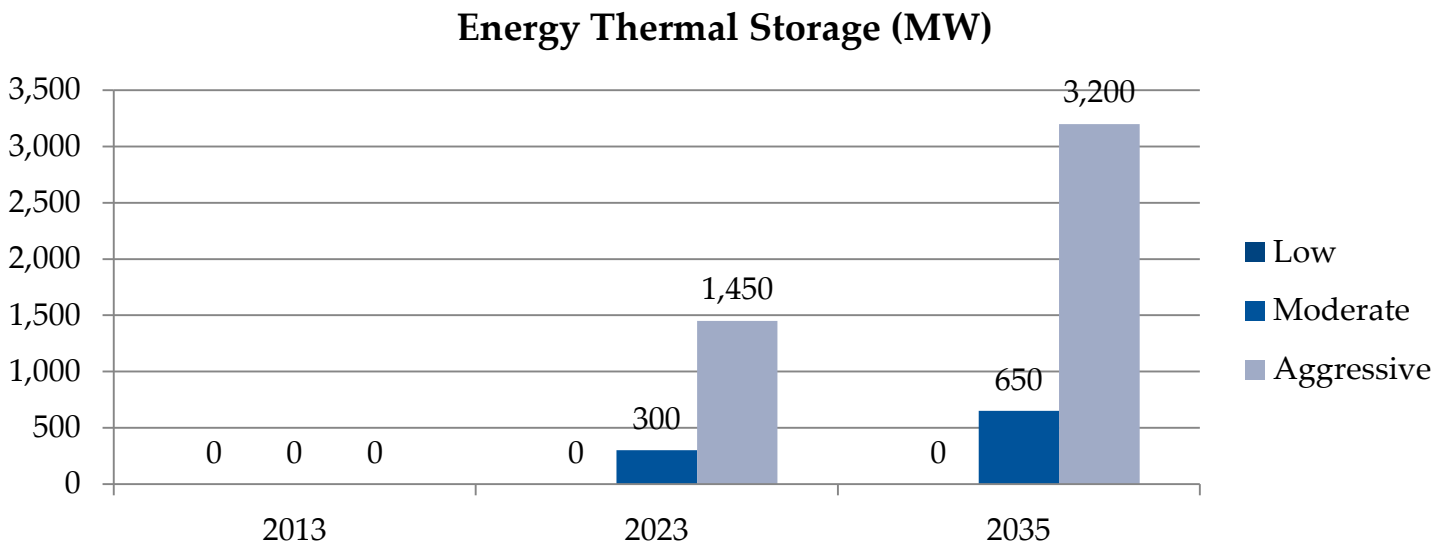

- The heating from geothermal estimates were derived from ENE's forecasts, American Community Survey results and a 2009 study by Navigant for DOE EERE.
- The moderate goal targets 1.0 T BTU by 2035, an average of the aggressive and low cases.
- The aggressive goal targets 4.4 T BTU by 2035, which corresponds to 30% of homes using geothermal heating by 2035.





NAVIGANT ENERGY

# Deploy Energy Thermal Storage (ETS)




- The energy thermal storage capacities were estimated from data by VCharge, an ETS start-up.
- The moderate goal targets 650 MW by 2035, an average of the aggressive and low cases.
- The aggressive goal targets 3,200 MW of ETS by 2035, which corresponds to having 1/3 of homes heating with oil/propane using ETS by 2035.

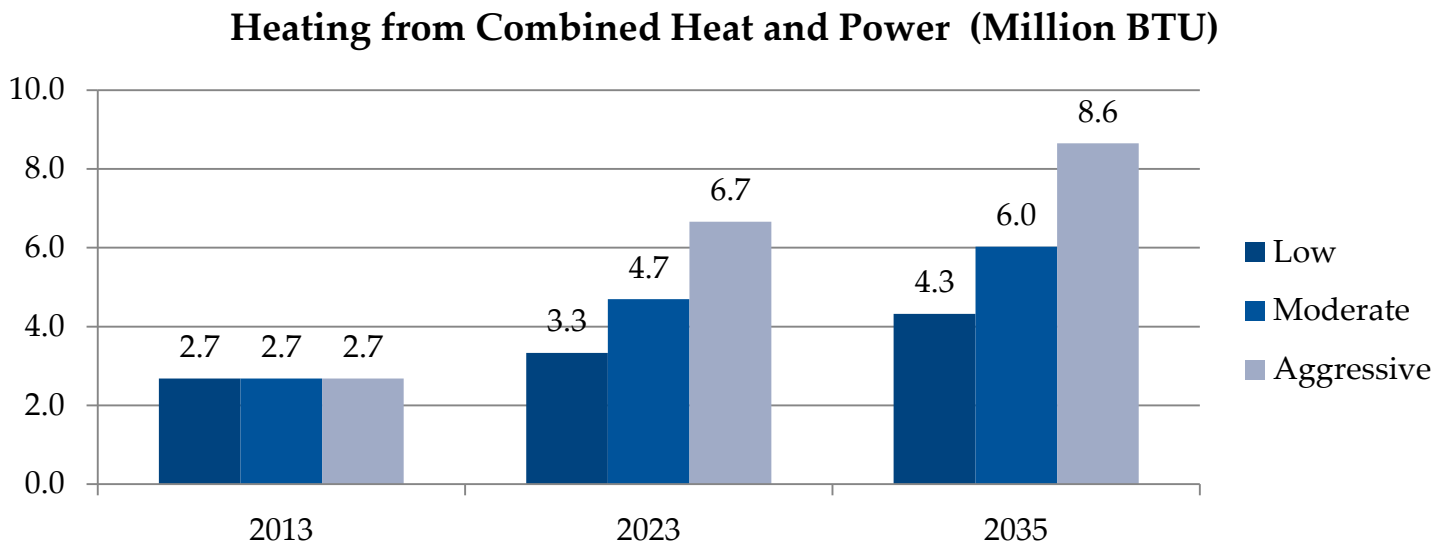




NAVIGANT ENERGY

DRAFT

# Increase Heating from Combined Heat and Power



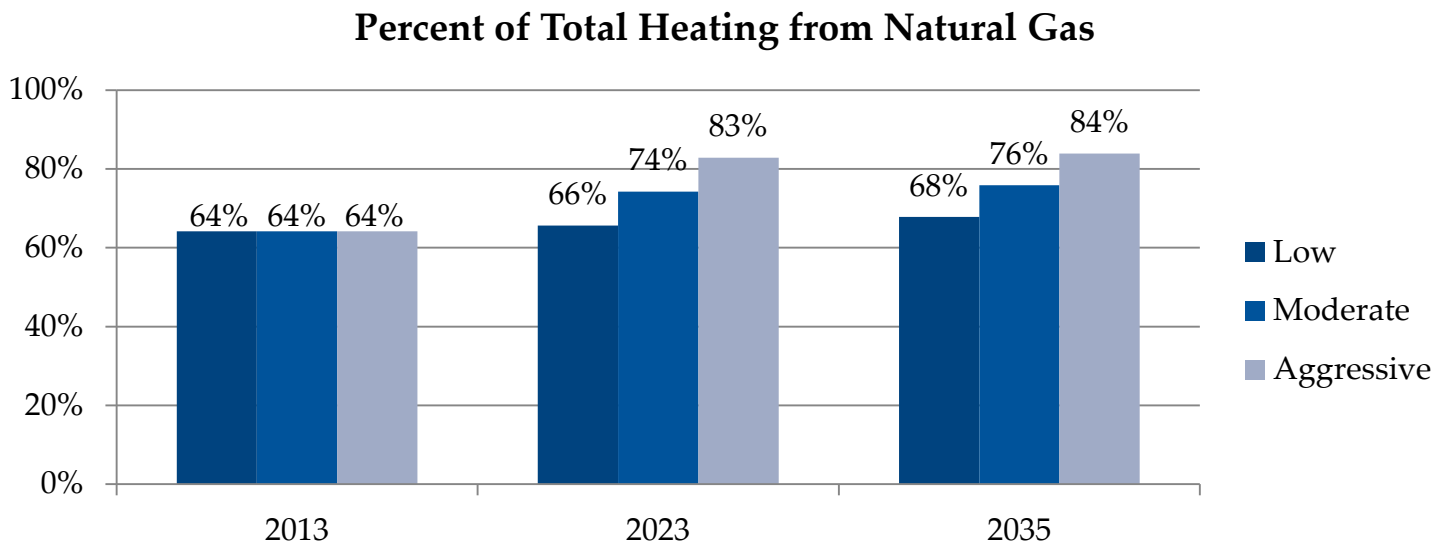

- The CHP capacity estimates are based on a 2012 CHP Study for DOE EERE, 2000 DOE CHP Potential Study, the EERMC's Opportunity Report, Phase 1 and EIA data.
- The moderate goal targets 6.0 MMBTU of thermal energy from CHP by 2035.
- The aggressive goal targets 8.6 MMBTU of thermal energy from CHP by 2035. This number was derived from the CHP capacity (MW) previously estimated and an assumed 75% capacity factor.





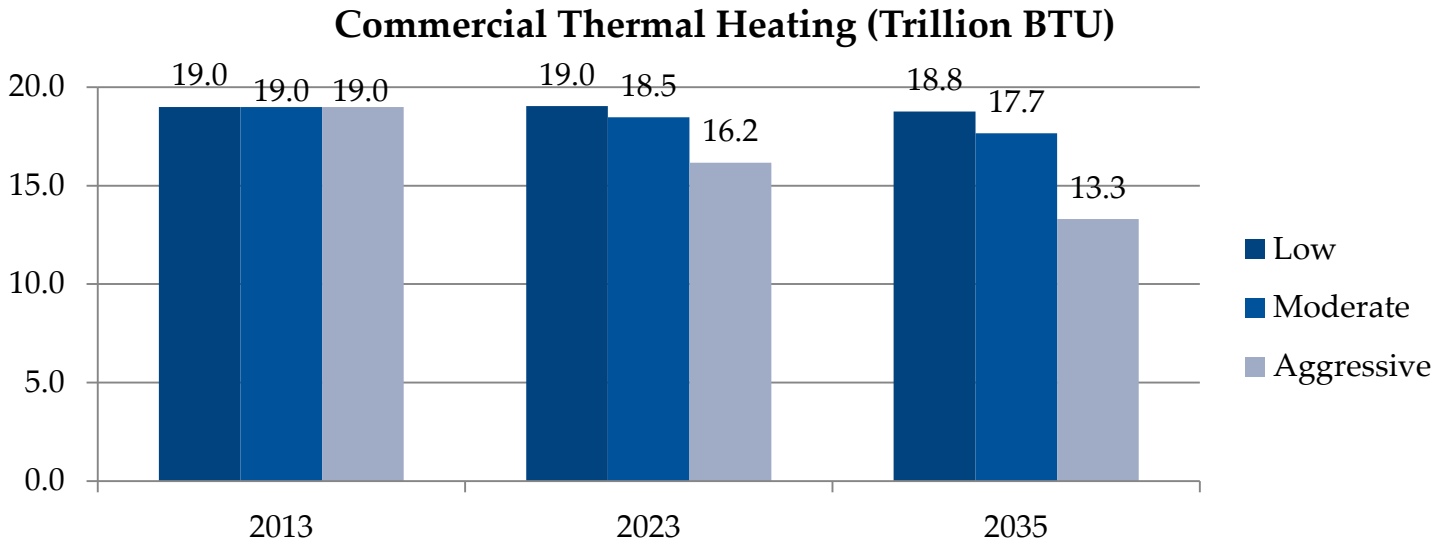
NAVIGANT ENERGY

# Increase Heating from Natural Gas




- The heating from natural gas data were extracted from ENE's forecasts, which rely on data from the EIA.
- The moderate goal targets an average between the low and aggressive cases.
- The aggressive goal targets 84% of heating from natural gas by 2035, which corresponds to a 50% conversion of non-natural gas heating to natural gas heating.

# Accelerate Commercial Thermal Efficiency Measures




- The commercial thermal heating data were from ENE's forecasts and the thermal efficiency savings potential of RI was estimated from data from the Environmental and Energy Study Institute.
- The moderate goal targets 17.7 T BTU of thermal energy by 2035, or 20% of gains associated with the aggressive target.
- The aggressive bound targets 13.3T BTU of thermal energy by 2035, corresponding to 30% thermal efficiency gains compared to 2013.

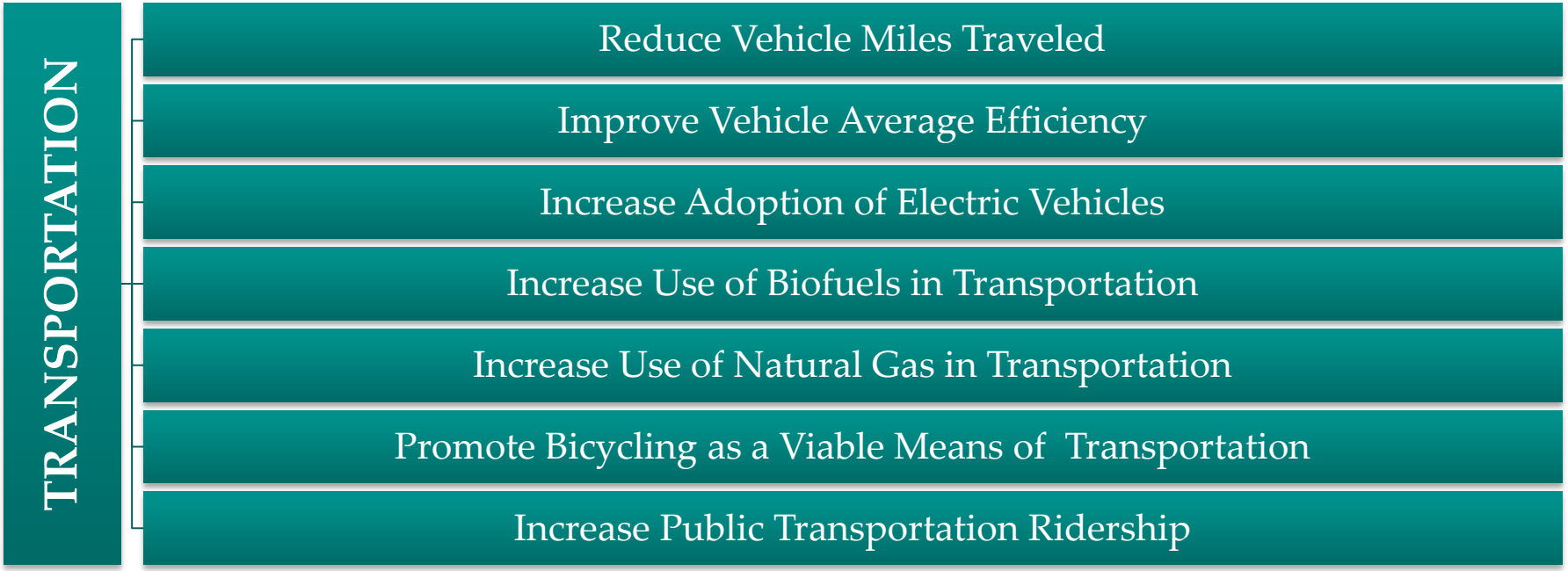




NAVIGANT ENERGY

DRAFT

**Navigant has developed low, moderate, and aggressive targets for change across the following 7 categories for the transportation sector.**

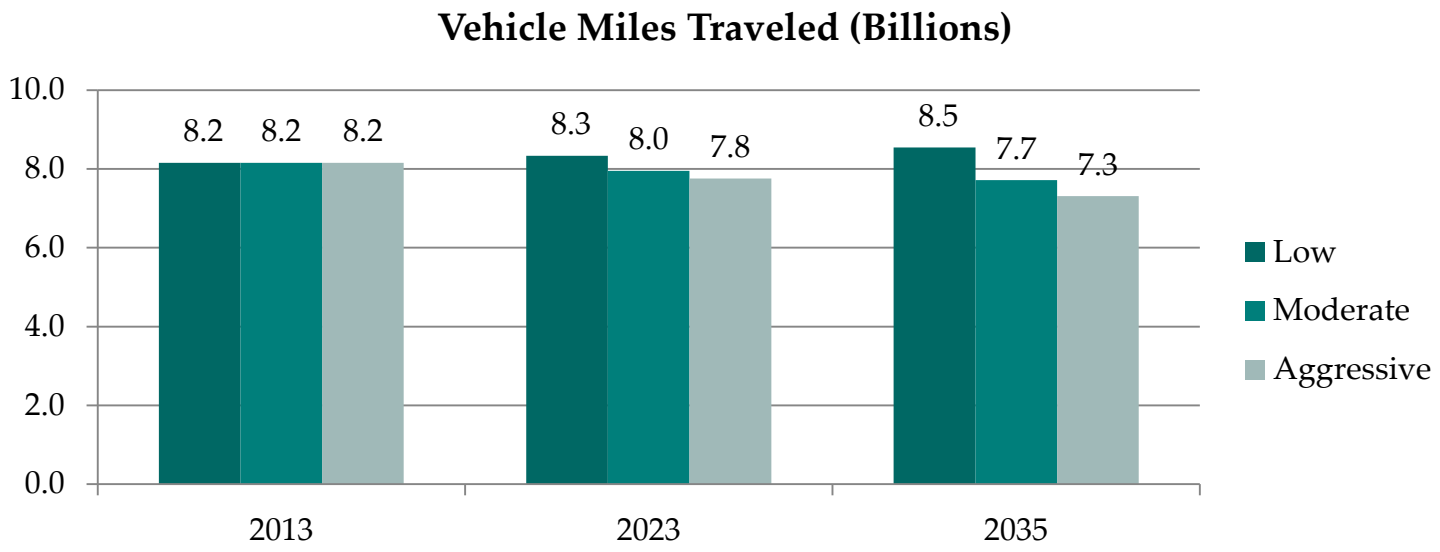







NAVIGANT ENERGY

# Reduce Vehicle Miles Traveled



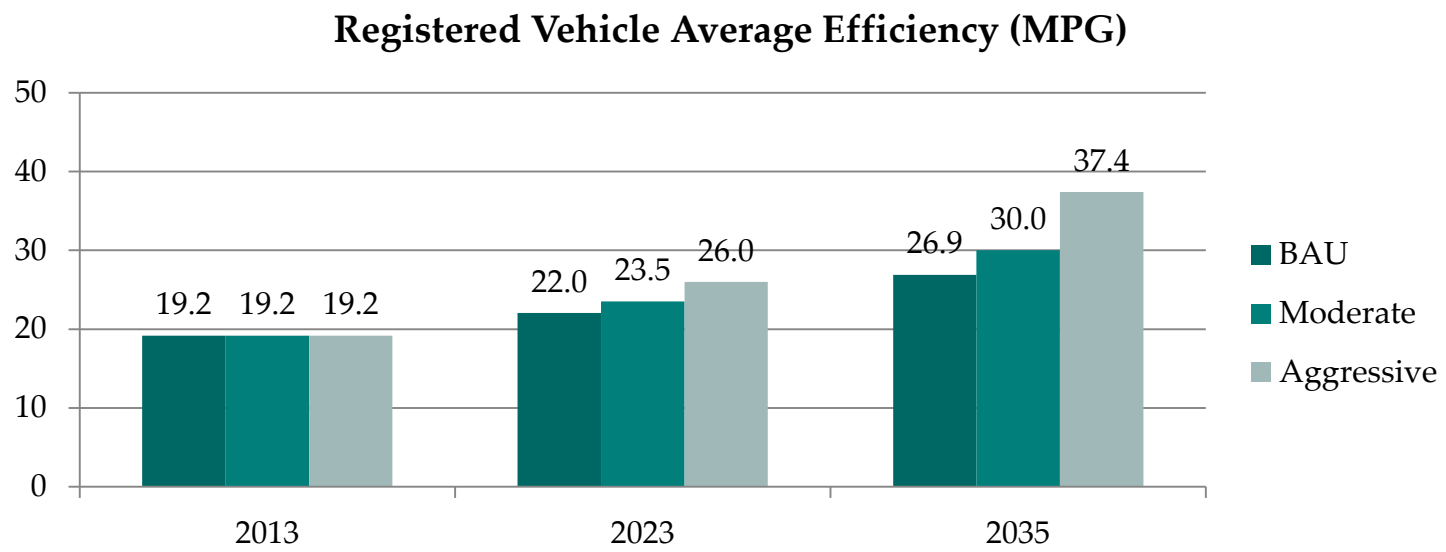

- The VMT forecast is based on U.S. DoT Office of Highway Policy Information Traffic Volume Trends Reports for Rhode Island (monthly data from 2003 – 2012)
- The moderate and aggressive targets represent 5% and 10% reductions from current levels following examples from Denver, Sacramento, and San Francisco Bay Area plans directed at reducing VMT while promoting economic growth.



NAVIGANT ENERGY

DRAFT

# Improve Vehicle Average Efficiency



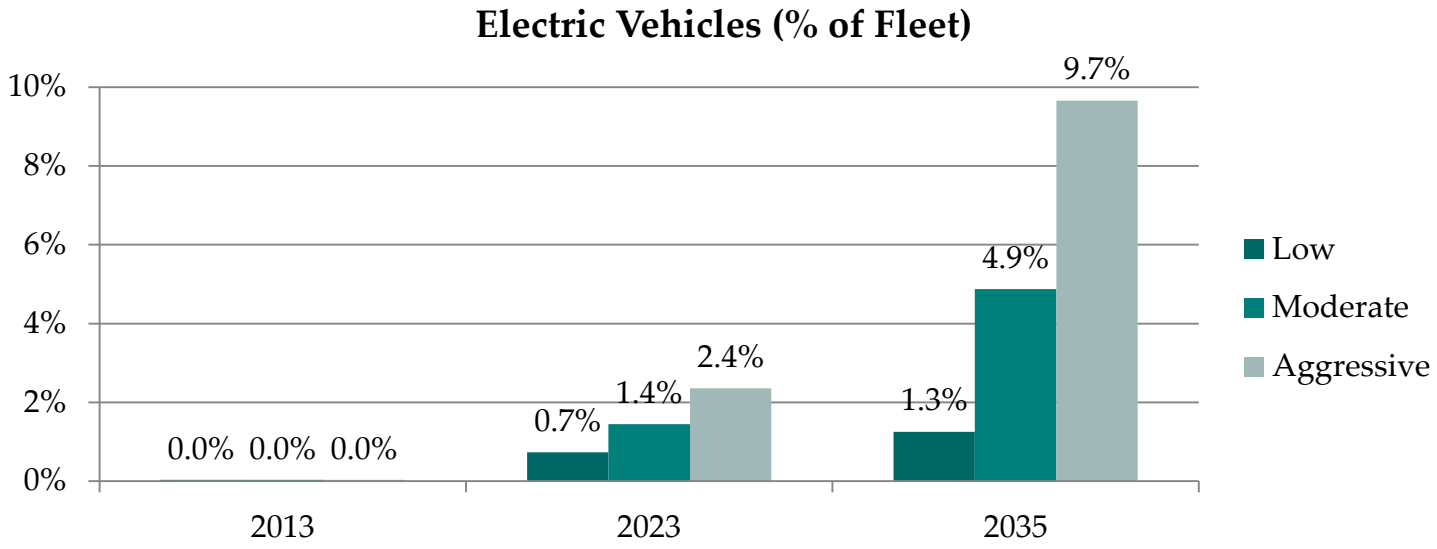

- Vehicle average efficiency is based on ENE's BAU forecast for fuel consumption (gasoline and diesel) compared against the U.S. DoT VMT statistics for the same period (2003 – 2012).
- The moderate goal targets 30 MPG on average by 2035 and back casts annual changes to arrive at the projected 2023 level.
- The aggressive target looks at the resulting average efficiency if the rate of change in the moderate case was 50% higher.





NAVIGANT ENERGY

# Increase Adoption of Electric Vehicles

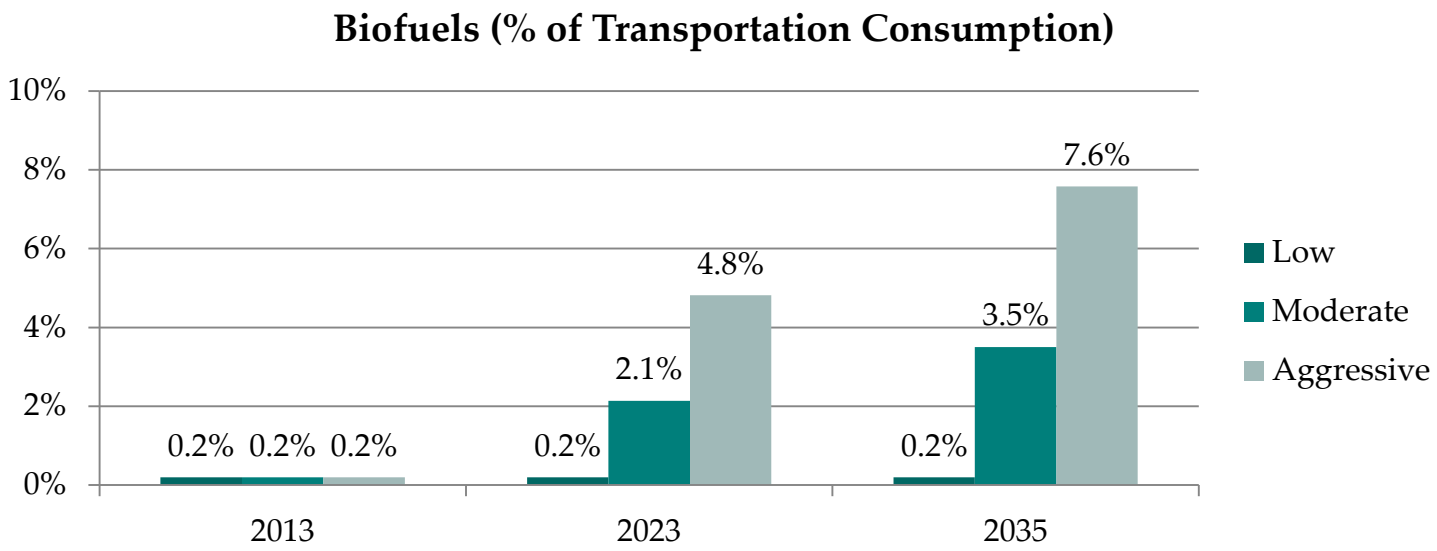



- The low target is based on 2012 Navigant Research Report detailing National EV Sales through 2020, scaled using FHWA registration figures for RI .
- Moderate and aggressive targets based on Bass diffusion models from University of Michigan Study: Market Models for Predicting PHEV Adoption and Diffusion both targeting 10% of market adjusted to reflect a market driven by early adopters alone (moderate case) and a market with a strong follow effect (aggressive case).



NAVIGANT ENERGY

# Increase Use of Biofuels in Transportation




- The low target is based on ENE forecast of Fuel Ethanol (E85) Consumption and US DOE Alternative Fuels Data Center which identified two bio-diesel stations (recycled cooking oil) and zero E85 filling stations in-state.
- Moderate and aggressive E85 targets based sales to date of flex-fuel vehicles assuming 20% and 50% conversion.
- Moderate and aggressive biofuel targets based on 10% and 20% diesel fleet conversion to B20 blend by 2035.

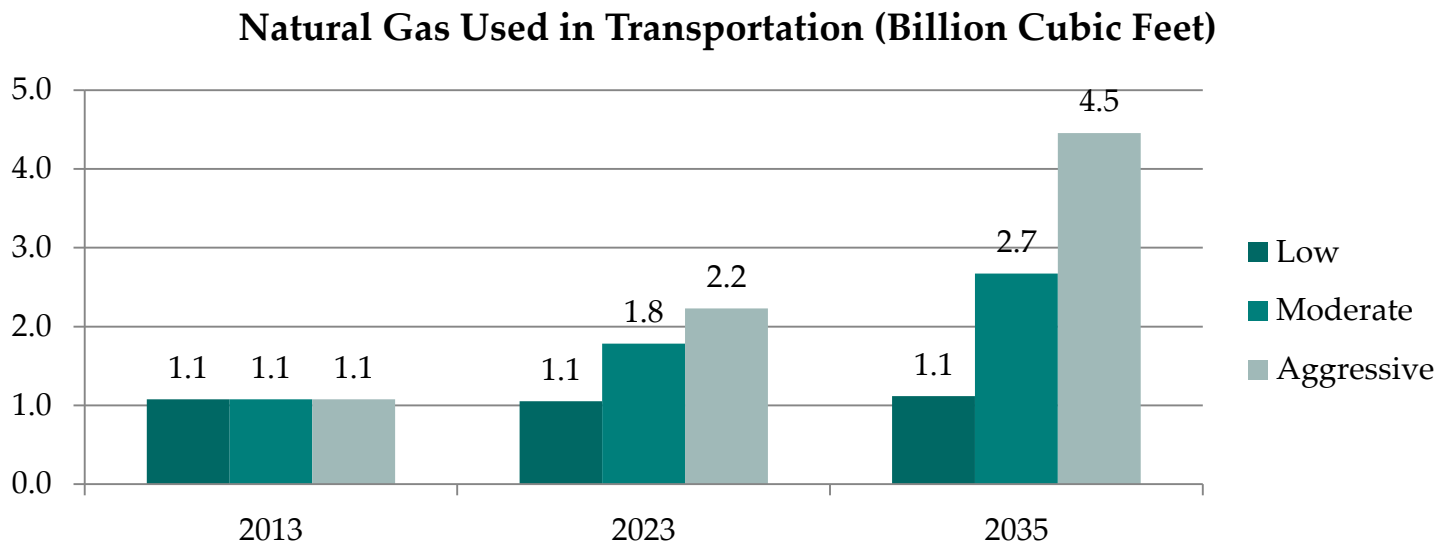




NAVIGANT ENERGY

DRAFT

# Increase Use of Natural Gas in Transportation




- The low target is based on ENE forecast of NG consumption in transportation.
- Moderate and aggressive targets based on balance of National Highway Association registration data for public and private busses attributing all current NG consumption to publicly owned busses.
- Moderate targets move from 31% NG to 60% NG for busses and aggressive targets 100% of busses powered by NG in 2035, with a 50% interim target.

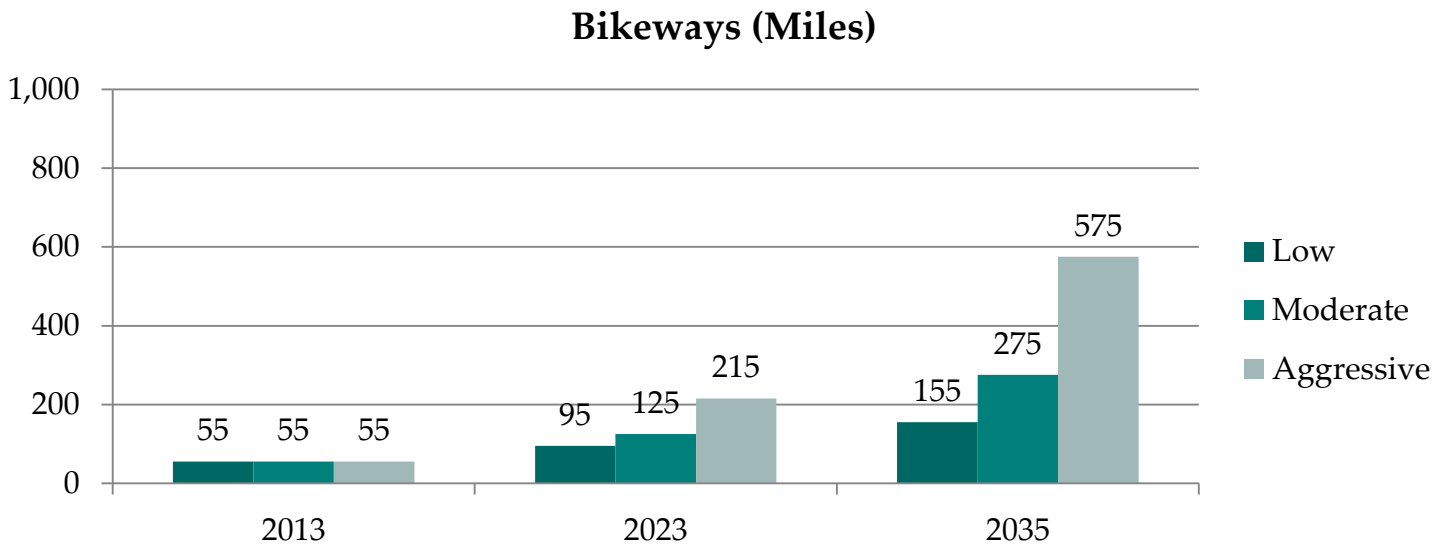




NAVIGANT ENERGY

DRAFT

# Promote Bicycling as a Viable Means of Transportation




- The low target is based on RIDoT - Bike Rhode Island figures: Current paths (2013), those under-construction (2023), and 50% of identified.
- Moderate targets assume all under construction and 25% of those identified to be completed by 2023, with the remaining 75% and an additional 50% (previously unidentified) completed by 2035.
- Aggressive targets aim for all under-construction and identified bikeways are completed by 2023 and another 360 miles completed by 2035.

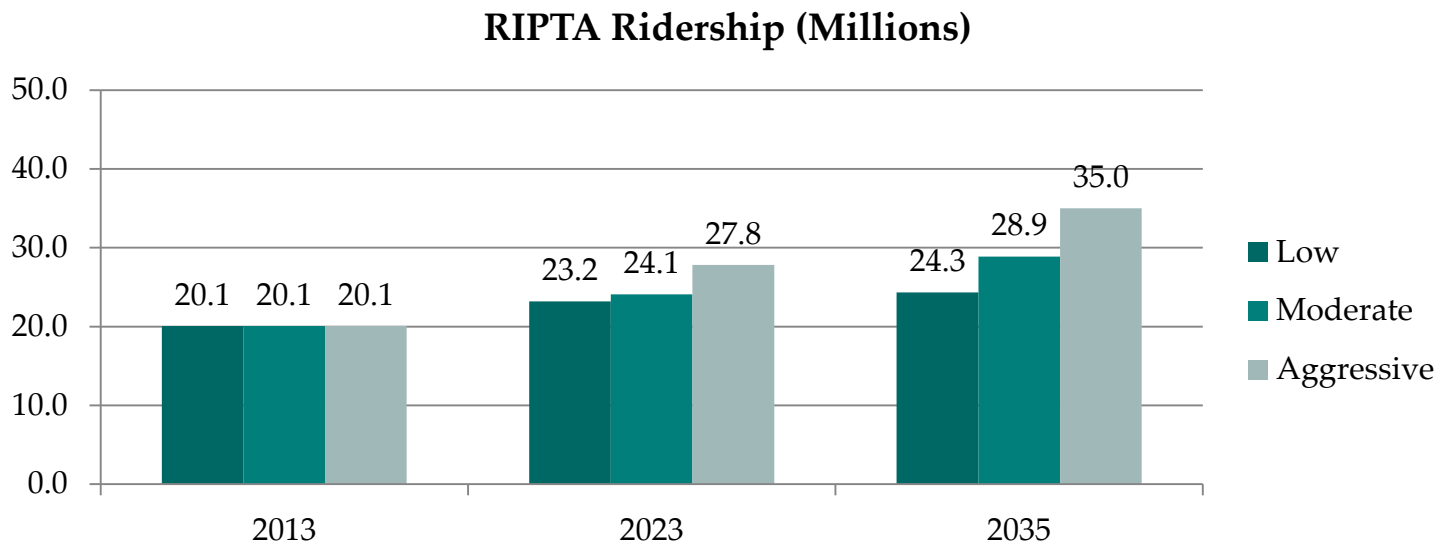




NAVIGANT ENERGY

DRAFT

# Increase Public Transportation Ridership




- The low target is based on RIPTA 5 year program to expand ridership by 10%. Assumed additional 5% growth through 2023 and 2035.
- Moderate targets assumes RIPTA can maintain similar levels of growth as identified in their 5 year plan through 2035.
- Aggressive targets aims to increase that rate by 20% and target 35 million rides by 2035.





NAVIGANT ENERGY

DRAFT

1. Introduction and Purpose
2. Workflow: Targets, Strategies, and Scenarios
3. Electric, Thermal, and Transportation Targets
4. Straw-man Scenarios
5. Next Steps





NAVIGANT ENERGY

**Navigant created 3 straw-man scenarios for discussion. These will be modified based on feedback from the Advisory Council.**

| Scenario 1: Demand Reduction | Scenario 2: Renewables Pioneer | Scenario 3: Alternative Power |
|---|---|---|
| • Aims to cut GHG emissions and energy related expenditures through aggressive measures to reduce in-state energy demand across the three sectors. | • Aims to reduce GHG emissions and position Rhode Island as an environmental leader through significant investment in distributed renewables and vehicle electrification. | • Aims to reduce GHG emissions and promote energy security through fuel switching and the development of industrial scale renewables. |





NAVIGANT ENERGY

DRAFT

1. **Revised Workflow: Scenarios, Targets, and Strategies**
2. **Electric, Thermal, and Transportation Targets**
3. **Revised Straw-man Scenarios**
4. **Next Steps**





NAVIGANT ENERGY

DRAFT

# Following this meeting, Navigant will solicit feedback from the Advisory Council, finalize the scenarios, and proceed with Task 4.






NAVIGANT ENERGY

# *Key* CONTACTS


**Lisa Frantzis**
Managing Director in Charge
Burlington, MA
781-270-8314
lfrantzis@navigant.com

**Ben Barrington**
Day to Day Program Manager
Burlington, MA
781-354-7070
ben.barrington@navigant.com

**Andrew Kinross**
Director
Burlington, MA
781-270-8486
akinross@navigant.com

**Lea Poquerusse**
Senior Consultant
Burlington, MA
781-270-8344
Lea.poquerusse@navigant.com

**Kially Ruiz**
Subcontractor / MBE
President, Aquinergy LLC
Portsmouth, RI
401-835-4033
kruiz@aquinergy.com






NAVIGANT
ENERGY

# Next Steps

# Next Steps

**Next Steps:**

- Advisory Council members will provide feedback on **draft targets and strategies** via email to OER **by Friday, May 17th COB**
- The Implementation Group Kickoff meeting will be held **Friday, May 24th, 9am-12pm** at the URI Bay Campus, Coastal Institute, Hazard Rms.
- The next Advisory Council meetings will be scheduled for **late June** and **late July**

# Rhode Island State Energy Plan

## Advisory Council Meeting #5

May 9, 2013